CLAIMS

What is claimed is:

1. A spoked wheel for a bicycle, comprising a hub, having an axis (X) defining the wheel's axis, a rim and a plurality of spokes, that connect the hub to the rim, wherein said spokes are arranged in groups and wherein at least two spokes of each group cross over one another when viewed in the direction of the axis (X) of the wheel.

2. The spoked wheel of claim 1, wherein each group of spokes comprises one or more spokes (A) connected to a first hub portion and one or more spokes (B) connected to a second hub portion that are set at an axial distance apart from said first hub portion.

3. The spoked wheel of claim 2, wherein in each group of spokes, the spokes (A) connected to the first hub portion differ in number from the spokes (B) connected to the second hub portion.

4. The spoked wheel of claim 2, wherein spokes connected to the same hub portion cross over one another.

5. The spoked wheel of claim 2, wherein spokes connected to different hub portions cross over one another.

6. The spoked wheel of claim 4, wherein the spokes crossing over one another are adjacent.

7. The spoked wheel of claim 1, wherein the spokes of each group of spokes, viewed in the direction of the wheel's axis, have an arrangement that is specular with respect to a radial plane of symmetry.

8. The spoked wheel of claim 7, wherein in each group of spokes, the spokes connected to at least one of the two hub portions are odd in number and include a spoke which, when viewed in the direction of the wheel's axis, is set at the center of the group, in said radial plane of symmetry.

9. The spoked wheel of claim 1 wherein tensile forces of the spokes of each group are substantially balanced with one another in the direction of the wheel's axis.

10. The spoked wheel of claim 1 wherein tensile forces of the spokes of each group are substantially balanced with one another in a direction tangential with respect to the center of the wheel and contained in a plane orthogonal to the wheel's axis.

11. The spoked wheel of claim 1, wherein the groups of spokes are set at a distance apart from one another on the rim by an amount greater than the distance occupied on the rim by each group.

12. The spoked wheel of claim 1 wherein the groups of spokes on the rim are set at equal distances apart from one another.

13. The spoked wheel of claim 1, wherein each group of spokes comprises three spokes.

14. The spoked wheel of claim 13, wherein in each group of three spokes, one spoke is connected to a first hub portion and the other two spokes are connected to a second hub portion, set at an axial distance apart from said first hub portion.

15. The spoked wheel of claim 14, wherein the two spokes connected to the second hub portion, when viewed in the direction of the wheel's axis, cross over one another.

16. The spoked wheel of claim 15, wherein the two spokes connected to the second hub portion, when viewed in the direction of the wheel's axis, are set symmetrically with respect to a radial plane passing through the wheel's axis.

17. The spoked wheel of claim 15, wherein the spoke connected to the first hub portion extends in a radial plane containing the wheel's axis.

18. The spoked wheel of claim 17, wherein the three spokes of each group cross over one another all substantially at the same radial point, when viewed in the direction of the wheel's axis.

19. The spoked wheel of claim 18, wherein the radial point of crossing-over of the spokes of each group of three spokes is closer to the hub than to the rim.

20. The spoked wheel of claim 17, wherein tensile forces of the spokes of each group of three spokes are substantially balanced with one another in the direction of the wheel's axis.

21. The spoked wheel of claim 17, wherein tensile forces of the spokes of each group of three spokes are substantially balanced with one another in a

direction tangential with respect to the center of the wheel and contained in a plane orthogonal to the wheel's axis.

22. The spoked wheel of claim 17, wherein the spoke connected to the first hub portion and the two remaining spokes of each group of three spokes present different angles of inclination with respect to a median plane of the wheel.

23. The spoked wheel of claim 22, wherein tensile forces of the spokes of each group of three spokes have components in the direction of the axis of the wheel and are substantially balanced with one another.

24. The spoked wheel of claim 22, wherein tensile forces of the spokes of each group of three spokes have components in a direction tangential with respect to the center of the wheel and contained in a plane perpendicular to the axis of the wheel and are substantially balanced with one another.

25. The spoked wheel of claim 22, wherein the tensile forces of the two spokes of each group of three spokes connected to the second hub portion are substantially equal to one another.

26. The spoked wheel of claim 22, wherein the sum of tensile forces of the two spokes connected to the second hub portion and tensile force of the spoke connected to the first hub portion have their tensile force components in a plane containing the axis of the wheel, and wherein the components are in a ratio with respect to one another that is substantially equal and inverse to the ratio of the sines of respective angles of inclination with respect to said plane median.

27. The spoked wheel of claim 17, wherein the wheel is a rear bicycle wheel and wherein the spokes are oriented with all of the radially extending spokes

on the same hub portion, so that one hub portion has twice the number of spokes than the other hub portion.

28. The spoked wheel of claim 27, wherein the hub portion with twice the number of spokes than the other is the hub potion corresponding to the end of the hub which accepts a sprocket cassette.

29. The spoked wheel of claim 17, wherein the wheel is a front wheel and wherein the groups of three spokes are alternately oriented with the radially extending spokes alternately connected on the first and second hub portions.

30. The spoked wheel of claim 2, wherein the spokes connected to said first hub portion and to said second hub portion comprise tensile forces and have different camber angles (α, β) and wherein each group of spokes has a number (m) of spokes connected to said first hub portion and a number (n) of spokes connected to said second hub portion such that the ratio (m/n) substantially approximates the inverse ratio ($\sin\beta/\sin\alpha$) of the sines of the respective camber angles.

31. The spoked wheel of claim 30, wherein the sum of tensile forces of the spokes of the wheel connected to said first hub portion and the sum of tensile forces of the spokes connected to said second hub portion are balanced with one another in the direction of the axis of the wheel.

32. A spoked wheel for a bicycle having an axis and comprising a hub having a first portion and a second portion, a rim, and a plurality of spokes connecting said hub to said rim, wherein the plurality of spokes are arranged in groups comprising an odd number of spokes.

33. The spoked wheel of claim 32 wherein the groups of odd numbered spokes comprise a center spoke that extends radially from the hub.

34. The spoked wheel of claim 32, wherein at least two spokes cross over one another when viewed in the direction of the wheel's axis.

35. The spoked wheel of claim 34, wherein the spokes crossing over one another are adjacent.

36. The spoked wheel of claim 32, wherein the maximum distance on the rim between 2 adjacent spokes is less than the distance on the rim between two different groups.

37. The spoked wheel of claim 32, wherein at least two spokes connect the first hub portion to the rim and at least one spoke connects the second hub portion to the rim, said at least one spoke extending radially from said second hub portion.

38. The spoked wheel of claim 32, wherein one hub portion comprises the same number of spokes as the other hub portion.

39. The spoked wheel of claim 32, wherein one hub portion comprises twice as many spokes as the other hub portion.

40. The spoked wheel of claim 39, wherein the hub portion comprising twice as many spokes as the other hub portion further comprises a sprocket cassette.

41. A bicycle wheel comprising:

a hub having an axis (X) and a median plane (M) generally perpendicular to the axis (X);

a rim; and

a plurality of spokes, arranged in groups (R), connecting the hub to the rim,

wherein each group of spokes has at least two spokes that define a crossover (P) on a first side of the median plane and at least one spoke on a second side of the median plane and the spokes on each side of the median plane produce generally equal forces in opposite directions along the axis (X) that maintain the rim centered about the median plane.

42. The spoked wheel of claim 41, wherein each group (R) of spokes comprises one or more spokes (A) connected to a first hub portion and one or more spokes (B) connected to a second hub portion that are set at an axial distance apart from said first hub portion.

43. The spoked wheel of claim 42, wherein in each group of spokes, the spokes (A) connected to the first hub portion differ in number from the spokes (B) connected to the second hub portion.

44. The spoked wheel of claim 41, wherein the spokes of each group of spokes, viewed in the direction of the wheel's axis, have an arrangement that is specular with respect to a radial plane of symmetry.

45. The spoked wheel of claim 44, wherein in each group of spokes, the spokes connected to at least one of the two hub portions are odd in number and include a spoke which, when viewed in the direction of the wheel's axis, is set at the center of the group, in said radial plane of symmetry.

46. The spoked wheel of claim 41, wherein the spoke on the second side of the median plane extends radially from the hub to the rim when viewed in the direction of the wheel's axis.

47. The spoked wheel of claim 41, wherein each group of spokes (R) comprises three spokes.

48. The spoked wheel of claim 47, wherein in each group of three spokes, two spokes are connected to a hub portion on the first side of the median plane and the other spoke is connected to a hub portion on the second side of the median plane, said hub portions set at an axial distance apart.

49. The spoked wheel of claim 47, wherein tensile forces of the spokes of each group of three spokes have components in the direction of the axis of the wheel and are substantially balanced with one another.

50. The spoked wheel of claim 48, wherein the tensile forces of the two spokes of each group of three spokes connected to the hub portion on the first side of the median plane are substantially equal to one another.

51. The spoked wheel of claim 48, wherein the sum of tensile forces of the two spokes connected to the hub portion on the first side of the median plane and tensile force of the spoke connected to the hub portion on the second side of the median plane have their tensile force components in a plane containing the axis of the wheel, and wherein the components are in a ratio with respect to one another that is substantially equal and inverse to the ratio of the sines of respective angles of inclination with respect to said plane median.

52. The spoked wheel of claim 48, wherein the wheel is a rear bicycle wheel and wherein the spokes are oriented with all of the radially extending spokes on the same hub portion, so that one hub portion has twice the number of spokes than the other hub portion.

53. The spoked wheel of claim 52, wherein the hub portion with twice the number of spokes than the other is the hub potion corresponding to the end of the hub which accepts a sprocket cassette.